



BIOSOLIDS MANAGEMENT PROGRAM &  
ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

*ANNUAL PERFORMANCE REPORT*  
*2012-2013*



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# 2012-2013

City of Fort Worth, Texas  
Water Department  
Village Creek Water Reclamation Facility  
Biosolids Management Program and EMS Performance Report

## Contents

|   |           |
|---|-----------|
| <b>Introduction</b>   | <b>1</b>  |
| Biosolids EMS Certification   | 1         |
| Biosolids EMS Verification  | 1         |
| Annual Performance Report   | 1         |
| <b>Section 1: Biosolids Management Program</b>                      | <b>2</b>  |
| Biosolids Production  | 2         |
| Beneficial Reuse Options and Management Practices                   | 2         |
| Contractor Performance  | 4         |
| City Oversight/Inspections  | 4         |
| Monitoring and Measurement  | 4         |
| <b>Section 2: Environmental Management System (EMS) Performance</b> | <b>7</b>  |
| Summary   | 7         |
| Environmental Management System (EMS)                               | 7         |
| National Biosolids Partnership                                      | 7         |
| Timeline  | 8         |
| Goals and Objectives  | 8         |
| Support   | 8         |
| Corrective Action Notices (CANs)                                    | 8         |
| <b>Section 3: Legal Requirements</b>                                | <b>9</b>  |
| <b>Section 4: Spills, Emergency Actions, and Response</b>           | <b>9</b>  |
| <b>Section 5: Public Outreach and Participation Program</b>         | <b>9</b>  |
| Website   | 9         |
| Tours   | 9         |
| Notification of Land Application Activities                         | 9         |
| Publications  | 10        |
| <b>Section 6: Future Plans/Advances in Biosolids Technology</b>     | <b>11</b> |
| <b>Section 7: Contact Information</b>                               | <b>11</b> |
| <b>Appendix A: Corrective Action Notices 2012-2013</b>              | <b>12</b> |
| <b>Appendix B: Goals and Objectives</b>                             | <b>16</b> |

## INTRODUCTION

During the past year (August 1<sup>st</sup>, 2012-July 31<sup>st</sup>, 2013), the City of Fort Worth's Water Department beneficially reused/recycled 98% of its Class A, Exceptional Quality (EQ) biosolids. Biosolids were land applied on thousands of acres of farmland and ranchland in the North Texas area. This is the twenty-second (22<sup>st</sup>) consecutive year that the City of Fort Worth has operated a biosolids land application program.

The biosolids program is a public/private partnership where the contractor, Renda Environmental, Inc. (REI), is responsible for processing, dewatering, transporting and performing beneficial land application of biosolids produced from the Village Creek Water Reclamation Facility. REI is under contract to provide these services until March 31, 2015.

### Biosolids EMS Certification

In July 2005, the Fort Worth Biosolids Program obtained national certification from the National Biosolids Partnership (NBP) for their establishment and operation of an Environmental Management System (EMS). To obtain this certification, the Fort Worth Biosolids Program underwent a thorough evaluation and audit of their EMS practices and processes. The audit was conducted by both internal auditors and "EMS certified" third party auditors.

One year later (July 2006), the Fort Worth Biosolids EMS Program successfully underwent internal and external audits and met requirements to maintain EMS certification and obtained the "Biosolids EMS – Tier 4 Platinum Certification" which *"represents the highest achievement in biosolids management and environmental stewardship recognized by the Water Environment Federation (WEF), National Association of Clean Water Agencies (NACWA), and the United States Environmental Protection Agency (EPA)."*

### Biosolids EMS Verification

In October 2010, the Fort Worth Biosolids program was recertified by the National Biosolids Partnership. This was accomplished in a multi-day third party audit.

### Annual Performance Report

One of the requirements of the EMS Program (Element 15) is to provide an EMS Annual Performance Report (APR) outlining biosolids activities and operations during the previous year. This information is then made available to all interested parties.

This APR summarizes Fort Worth's biosolids management program performance, biosolids production and reuse, goals and objectives, EMS activities, public outreach, and the commitment towards continual improvement. This report and other biosolids information on operations and activities are detailed on the website, listed below.

[http://fortworthtexas.gov/water/info/default.aspx?id=6102&ekmense1=73b29971\\_1308\\_2386\\_6102\\_4](http://fortworthtexas.gov/water/info/default.aspx?id=6102&ekmense1=73b29971_1308_2386_6102_4)

## SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM

|   |  |
|---|--|
| Annual Biosolids Report Period:                       | August 1 <sup>st</sup> , 2012 to July 31 <sup>st</sup> , 2013                          |
| Registration/Permit Number:                           | TPDES #10494-013   |
| Class A Authorization Facility No.:                   | #720001  |
| Transporter No.:                                      | TCEQ--#21942 (Renda Environmental, Inc.)<br>TXDOT--#45267C (Renda Environmental, Inc.) |
| Amount of biosolids beneficially reused/recycled:     | 31,297.35 dry tons (without lime)/year   |
| Amount of biosolids beneficially reused/recycled:     | 28,392.96 dry metric tons (without lime)/year  |
| Percentage of biosolids beneficially reused/recycled: | 98.35%   |
| Type of biosolids produced:                           | Class A, Exceptional Quality (EQ)  |



### Biosolids Production

The City of Fort Worth produces biosolids at the Village Creek water Reclamation Facility (VC). During 2012-2013 VC produced 31,297.35 dry tons (without lime) of biosolids. Due to concerns regarding odor issues, 515.65 dry tons were landfilled (1.65% of total dry tons produced-without lime).

The Fort Worth Biosolids Beneficial Reuse/Recycling Program continues to produce environmentally safe Class A, EQ biosolids for land application purposes.

The biosolids that VC produces are anaerobically digested and dewatered by belt filter press to produce a cake product that is 20% to 23% solids.

Post-lime stabilization is performed after dewatering in order to meet VC's TPDES permit requirements for vector attraction reduction. The biosolids are then land applied by Renda Environmental, Inc.; the City's contractor.



### Beneficial Reuse Options and Management Practices

Biosolids produced at VC were properly processed, monitored, and agronomically land applied to thousands of acres of farm and pasture land in Tarrant and six surrounding counties in the North Texas area. The biosolids act as an excellent soil amendment and add to the nutrient value to crops and grasses.

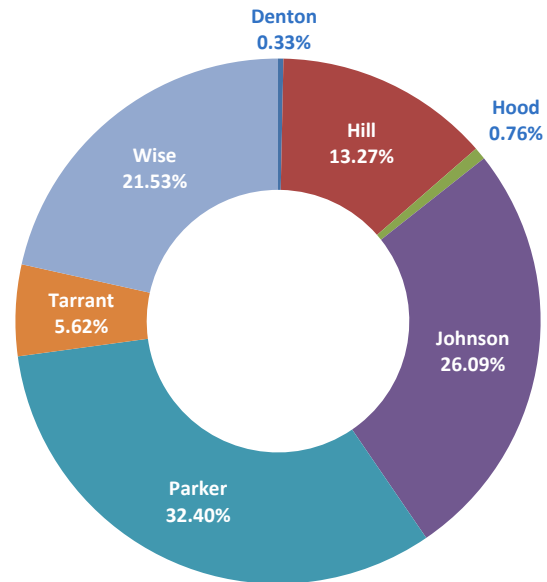


## SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM (CONT.)

The map and table below show landowner participation by county in the Fort Worth Beneficial Reuse/Recycling Program.



### Percent of Total Acreage by County



### BIOSOLIDS APPLICATION: AMOUNTS BY COUNTY

| Counties     | Landowners | Noticed Sites | Total Acreage | (%) of total acreage | Tons Applied<br>(Includes lime)<br>Aug 2012-Jul 2013 |
|--------------|------------|---------------|---------------|----------------------|--|
| Denton       | 1          | 1             | 125           | 0.33%                | -----  |
| Hill         | 8          | 20            | 5101          | 13.27%               | 10608.44   |
| Hood         | 2          | 2             | 291           | 0.76%                | -----  |
| Johnson      | 14         | 28            | 10033         | 26.10%               | 7438.68  |
| Parker       | 5          | 5             | 12459         | 32.41%               | 3210.3   |
| Tarrant      | 4          | 4             | 2162          | 5.62%                | 4254.82  |
| Wise         | 10         | 13            | 8276          | 21.53%               | 8896.87  |
| <b>TOTAL</b> | <b>44</b>  | <b>73</b>     | <b>38447</b>  | <b>100%</b>          | <b>34409.11</b>                                      |

## SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM (CONT.)



### Contractor Performance

Biosolids operations in Fort Worth are handled by Renda Environmental, Inc. (REI), a contractor for the City.

REI is responsible for:

- operation of the dewatering facility and further processing of the biosolids by belt-filter press dewatering,
- stabilization by lime addition,
- transportation, and
- land application to beneficially reuse the biosolids produced at VC.

REI is in compliance with all local, state, and federal requirements. REI operates and maintains the belt filter presses and all auxiliary equipment and continually monitors

and tracks the amount of biosolids applied to each land application site. REI has been proactive in seeking input on biosolids transportation and operations by establishing a telephone number (817.571.9852) for the general public. This number has been placed on all trucks and equipment used to transport and spread biosolids. REI conducts tours of the biosolids dewatering facility and the application sites when requested.

### City Oversight/Inspections

City personnel perform periodic unannounced visits and inspections to the dewatering facility and land application sites to ensure that the contractor is following best biosolids management practices concerning biosolids dewatering, transportation and land application.

While a site is undergoing land application, City personnel will perform a site inspection detailing weather conditions, truck conditions, haul road conditions, and overall site conditions. In July 2013, the City obtained an olfactometer to help quantify odors and establish an odor monitoring history at the land application sites.

When a land application site reaches completion, a final close-out visit is conducted by City personnel. This final site visit is performed to ensure that all biosolids material has been properly applied and all equipment has been removed.

### Monitoring and Measurement

By City contract, REI uses an independent certified laboratory to analyze the biosolids produced at VC.

Samples of biosolids are taken from the process areas and analyzed for fecal coliform, pathogens, metals, PCBs, pH, percent solids, and vector attraction reduction. Sampling frequency is established by the contract; which includes federal, state, and local regulatory reporting requirements and can be found summarized in the table on the next page.

## SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM (CONT.)

### TPDES CLASS A BIOSOLIDS MONITORING METHODS AND FREQUENCY

|   |  |
|---|--|
| 30 TAC 312.82 (a) Alternative 4         |  |
| <b>Pathogen Reduction</b>               | <ul style="list-style-type: none"> <li>Fecal Coliform Density &lt;1000 MPN*</li> <li>Enteric Virus Density &lt;1 Plaque-forming unit per 4 gram total solids**</li> <li>Viable Helminth Ova Density &lt;1 per 4 grams total solids**</li> </ul>                                    |
| 30 TAC 312.83 (b) (1-8) Alternative 6   |  |
| <b>Vector Attraction Reduction</b>      | <ul style="list-style-type: none"> <li>pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for two hours and then remain at a pH of 11.5 or higher for an additional 22 hours</li> </ul> |
| <b>Monitored Item</b>                   | <b>Frequency</b>   |
| <b>Fecal Coliform</b>                   | Two (2) times per month  |
| <b>Pathogens</b>                        | Two (2) times per month  |
| <b>Metals</b>                           | Monthly  |
| <b>PCBs</b>                             | Monthly  |
| <b>TCLP</b>                             | Two (2) times per year   |
| <b>pH (Vector Attraction Reduction)</b> | Operation Process-Daily; Regulatory Compliance Weekly  |
| <b>% Solids</b>                         | Daily  |
| * <i>Most Probable Number</i>           |  |
| ** <i>Dry Weight Basis</i>              |  |

Biosolids samples are analyzed monthly for metals and polychlorinated biphenyls (PCBs). For 2012-2013, all metal concentrations were significantly below Table 1 ceiling concentration limits and Table 3 pollutant concentrations as required by 40 CFR 503 and 30 TAC 312, for the use or disposal of sewage sludge. The metals and PCB concentrations are shown in the following table.



## SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM (CONT.)

## METAL AND PCB CONCENTRATION (REPORTED IN MG/KG DRY WEIGHT BASIS)

| Year<br>2012-2013                                | As<br>mg/kg | Cd<br>mg/kg | Cr<br>mg/kg | Cu<br>mg/kg | Pb<br>mg/kg | Hg<br>mg/kg | Mo<br>mg/kg | Ni<br>mg/kg | Se<br>mg/kg | Zn<br>mg/kg | PCB<br>mg/kg |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| <b>NPDES<br/>Permit<br/>Limits<br/>(Table 1)</b> | 75          | 85          | 3000        | 4300        | 840         | 57          | 75          | 420         | 100         | 7500        | n/a          |
| <b>NPDES<br/>Permit<br/>Limits<br/>(Table 3)</b> | 41          | 39          | 1200        | 1500        | 300         | 17          | ***         | 420         | 36          | 2800        | n/a          |
| <b>August</b>                                    | 14.50       | 1.86        | 36.70       | 401.00      | 28.10       | 0.32        | 12.60       | 28.60       | 2.62        | 475         | 0.00         |
| <b>September</b>                                 | 16.60       | 1.46        | 38.60       | 433.00      | 26.20       | 1.19        | 16.60       | 28.00       | 2.07        | 554         | 0.00         |
| <b>October</b>                                   | 10.40       | 1.62        | 34.60       | 388.00      | 24.50       | 0.40        | 12.90       | 30.80       | 6.51        | 503         | 0.00         |
| <b>November</b>                                  | 15.90       | 1.30        | 46.40       | 482.00      | 32.70       | 0.37        | 16.10       | 38.70       | 5.00        | 643         | 0.00         |
| <b>December</b>                                  | 11.50       | 0.68        | 40.40       | 450.00      | 24.60       | 0.33        | 14.20       | 31.80       | 3.90        | 539         | 0.00         |
| <b>January</b>                                   | 11.30       | 0.77        | 49.70       | 448.00      | 25.90       | 0.32        | 13.60       | 29.20       | 0.00        | 567         | 0.00         |
| <b>February</b>                                  | 9.00        | 0.58        | 34.70       | 402.00      | 22.70       | 0.44        | 10.20       | 22.70       | 3.40        | 511         | 0.00         |
| <b>March</b>                                     | 7.40        | 1.00        | 43.10       | 479.00      | 27.50       | 0.45        | 13.60       | 29.00       | 3.50        | 630         | 0.00         |
| <b>April</b>                                     | 6.10        | 1.30        | 44.60       | 465.00      | 27.40       | 0.48        | 13.80       | 32.10       | 0.00        | 630         | 0.00         |
| <b>May</b>                                       | 6.60        | 1.40        | 36.90       | 541.00      | 31.20       | 0.41        | 14.90       | 32.20       | 6.40        | 709         | 0.00         |
| <b>June</b>                                      | 3.10        | 1.20        | 37.30       | 498.00      | 24.10       | 0.34        | 15.30       | 36.40       | 7.10        | 627         | 0.00         |
| <b>July</b>                                      | 7.80        | 1.40        | 36.30       | 457.00      | 29.00       | 0.31        | 14.90       | 37.20       | 7.50        | 863         | 0.00         |
| <b>Yearly Avg.<br/>Metals<br/>Conc.</b>          | 10.02       | 1.21        | 39.94       | 453.67      | 26.99       | 0.45        | 14.06       | 31.39       | 4.00        | 604         | ND           |
| <b>Highest<br/>Monthly<br/>Conc.</b>             | 16.60       | 1.86        | 49.70       | 541.00      | 32.70       | 1.19        | 16.60       | 38.70       | 7.50        | 863         | ND           |

\*\*\*No limit established by federal regulations

Pathogen Requirement Achieved: Class A  
 Pathogen Reduction Alternative Used: 4  
 Vector Attraction Reduction Alternative Used: 6

In addition, the City and REI collect biosolids samples which then undergo TCLP (Toxicity characteristic Leaching Procedure) analysis. Two TCLP samples were collected during the 2012-2013 reporting year. All samples were compliant with TCLP standards.



## SECTION 2: ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) PERFORMANCE

### Summary

**Environmental Management System (EMS):** The biosolids EMS is a systematic approach that helps the City to continually improve activities that are associated with environmental performance. The National Biosolids Partnership (NBP) sets standards and guidelines that the City's EMS must achieve in order to receive and maintain NBP certification. A properly implemented EMS assists the City's Biosolids Program with the following:

- Identifying the overall goals and objectives of the Biosolids Program
- Creating a series of management practices to meet the goals and objectives
- Managing biosolids and monitoring and measuring the effectiveness of the program
- Taking corrective and preventative measures if the management practices are not operating correctly
- Conducting audits of the Biosolids EMS Program
- Requiring management involvement to make changes to the program as needed

On July 20, 2005, the City of Fort Worth Village Creek Water Reclamation Facility received NBP EMS certification. ***This made the City of Fort Worth the 7<sup>th</sup> agency in the United States and the 1<sup>st</sup> agency in Texas to receive this certification.***

**National Biosolids Partnership:** The National Biosolids Partnership is a voluntary partnership between the National Association of Clean Water Agencies (NACWA) and Water Environment Federation (WEF). NBP is committed to developing and advancing environmentally sound and sustainable biosolids best management practices through comprehensive management systems.

The mission of the NBP is to advance the understanding and adoption of effective practices in biosolids management and offer:

- Education and training;
- Technical assistance;
- An information clearinghouse; and
- An EMS-based third-party certification program for biosolids management systems.

**SECTION 2: ENVIRONMENTAL MANAGEMENT (EMS) SYSTEM PERFORMANCE (CONT.)****Timeline**

The EMS book was updated periodically throughout the reporting year, with several changes made in August 2013. The following table indicates additional biosolids EMS activities conducted during the past year.

| 2012-2013 EMS Activities | Date             |
|--------------------------|------------------|
| EMS Management Review    | October 9, 2012  |
| EMS Performance Report   | October 10, 2013 |

**Goals and Objectives**

The City has established goals and objectives for biosolids management and the EMS. The list of goals and objectives as shown in the EMS manual are included in “Appendix B: Goals and Objectives” of this report. Appendix B also shows the cost savings attributable to specific goals. Upon completion of these goals the City expects to decrease the purchased fuel for the VCWRF by at least 13,000,000 kWh/yr. These goals were updated October 10, 2013.

**Support**

*Contractor:* REI is fully committed in partnering with the City of Fort Worth in the continued improvement of the Fort Worth Biosolids EMS Program.

*City:* The Village Creek WRF personnel continue to support the EMS Program and take “ownership” in the EMS process by updating and establishing new plant Standard Operating Procedures in order to conform to EMS requirements and audit purposes.

**Corrective Action Notices (CANs)**

As defined in EMS Element 14, Corrective Actions are “specific actions and steps taken to correct an organization’s nonconformance(s) to environmental policies, procedures, and other requirements, and to mitigate any residual impacts to the environment.” It is the policy of the Fort Worth Biosolids EMS Program to create a CAN for an identified nonconformance as well as, identified opportunities for improvement. See Appendix A for a full listing of the Corrective Action Notices for August 2012-July 2013.

### SECTION 3: LEGAL REQUIREMENTS

The Village Creek Water Reclamation Facility permit to discharge wastes (WQ0010494013) was authorized by the TCEQ and was issued on December 29, 2011.

To find out more information on biosolids rules, regulations and requirements, visit the Secretary of State's website and view the Texas Administrative Code for 30 TAC 312 which details Sludge (Biosolids) Use, Disposal and Transportation :

[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC?tac\\_view=4&ti=30&pt=1&ch=312](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=312)

In addition, a summary of regulations applicable to the VC Biosolids program that exists in the EMS manual can be found on the City's website:

<http://fortworthtexas.gov/uploadedFiles/Water/Wastewater/Biosolids/Element%20No.%204%20-%20Legal%20Procedure.pdf>

### SECTION 4: SPILLS, EMERGENCY ACTIONS, AND RESPONSE

More than 780,000 miles were driven this past year in transporting biosolids to numerous land application sites without a major biosolids spill.

**Emergency Response Plans:** the City and REI continued to review and modify as necessary existing SOPs, check lists and operational changes pertaining to emergency response plans. An updated in-plant SOP was created in June 2011 with specific areas devoted to sludge/solids spills at VC.

### SECTION 5: PUBLIC OUTREACH AND PARTICIPATION PROGRAM

A main component of the City's EMS is to further develop and expand public outreach and public participation programs. The City and REI continued to reach out and inform the general public on biosolids, biosolids processing, biosolids stabilization, land application, biosolids fertilization, and the development of an EMS using best management practices for the Fort Worth Biosolids Program.

The Biosolids EMS' public outreach and participation include the following:

**Website:** The biosolids EMS website is periodically updated on the City's internet site to promote information sharing and opportunities for public input and feedback in a timely manner. The website includes links to various audit reports, annual performance reports, and the elements of the Biosolids EMS Manual.

**Tours:** The City and REI conduct tours of the Village Creek WRF and the Dewatering Facility. In 2012-2013, thirty four (34) plant tours were conducted. In all, 1067 individuals visited and toured the plant facilities. During the tours, visitors are shown a presentation that includes information on the biosolids program. Three city representatives from a nearby municipality received a tour of the Dewatering Facility to better understand our biosolids operations due to land application activities in their area. The benefits of Class A biosolids were discussed and VC and REI received positive feedback on the overall biosolids operation and program.


**Notification of Land Application Activities:** In an effort to be proactive, City personnel notify county officials of land application activities in their precinct. This gives opportunities for county officials to ask questions about biosolids and land application should they have any.

# 2012-2013

## City of Fort Worth, Texas Water Department Village Creek Water Reclamation Facility Biosolids Management Program and EMS Performance Report

### SECTION 2: ENVIRONMENTAL MANAGEMENT (EMS) SYSTEM PERFORMANCE (CONT.)

**Publications:** The City has two biosolids brochures; one brochure gives basic biosolids and program information, the other brochure gives technical information which includes monitoring and measurement details. These brochures are available to the public during facility tours, at all presentations, and on the City's biosolids website. The brochures were updated in August 2013.



**FORT WORTH PRODUCES CLASS "A" EXCEPTIONAL QUALITY BIOSOLIDS, THE HIGHEST CLASSIFICATION RECOGNIZED BY EPA**

**For more information:**

City of Fort Worth-Water Department  
Pollution Control Division  
<http://www.fortworthgov.org/water/>  
817.392.4965-Slave Nutter  
817.392.4979-Megan Lersch


Renda Environmental, Inc.  
<http://www.rendaenvironmental.com>  
817.571.9391-Ben Davis

**National Biosolids Partnership**  
<http://www.wef.org/biosolids/>


**Environmental Protection Agency  
Biosolids Program**  
<http://water.epa.gov/pollution/wastewater/treatment/biosolids/index.cfm>

**Comments or complaints?**  
Please call the City of Fort Worth at the numbers listed above.

**Are you a landowner that would like to have biosolids applied on your property? If so, then please contact Renda Environmental, Inc. at the phone number listed above.**



- Due to the high demand there is a 60 day waiting list for biosolids application
- Currently, land application occurs in Tarrant County and 6 surrounding counties
- Noticed sites must be at least 200 acres and easily accessible
- The current fee for land application is \$20 per acre
- Approximately 32,000 dry tons of biosolids are land applied annually



**Biosolids Beneficial Reuse & Recycling Program**

### City of Fort Worth Biosolids Program

**What are Biosolids?**  
Biosolids are the nutrient rich material created from the processing of wastewater. In Fort Worth, the biosolids are applied to local agricultural land. Biosolids act as a great fertilizer and as a soil stabilizer.

**Do biosolids have to be tested?**  
Yes, Fort Worth's biosolids are routinely monitored for hazardous compounds and pathogens. Heavy metal testing including arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc is conducted monthly along with testing for PCBs (polychlorinated biphenyls). Fecal coliform and other pathogens are sampled twice per month. The pH of the biosolids is taken at least once a week. Additional sampling, beyond what's listed above, may be conducted if needed.


**Our goal is to land apply 100% of all biosolids.**

**Are biosolids safe?**  
Yes! Numerous studies have shown that biosolids are safe for application on food crops.


**Are biosolids regulated?**  
The federal regulation, which is established by EPA, can be found in 40 CFR Part 503. This regulation sets metal concentration limits, pathogens and vector attraction reduction standards, record keeping and reporting requirements.

**Do biosolids smell?**  
Ideally biosolids will smell a little musty or have an "earthy" smell. Sometimes, the material will have an odor of ammonia or hydrogen sulfide (rotten eggs). This smell usually dissipates fairly quickly, especially if the biosolids are worked into the soil.

**Where are biosolids applied?**  
Landowners that want to use biosolids must have their land "noticed" by the Texas Commission on Environmental Quality (TCEQ). Once the notice is sent to the TCEQ the land is considered approved for biosolids land application.



**Now are biosolids created?**  
When you brush your teeth or take a shower, the water goes down the drain and into sanitary sewer pipes under the street. In Fort Worth, these pipes take the water to the Village Creek Water Reclamation Facility. The water is separated from the solid material (sludge) through clarification, aeration and filtration. The solids are then anaerobically (without oxygen) digested by bacteria for approximately 28 days. During this time the sludge is thickened to the consistency of milk. The sludge is then pumped to the Biosolids facility, about a mile north of Village Creek. This facility is operated by Renda Environmental as a public/private partnership with the City of Fort Worth. At the Biosolids facility, water is removed from the sludge via belt presses, after which it resembles potting soil. A pH adjustment is performed to reduce the odor and kill harmful pathogens (E. coli, Salmonella, etc.) that may still be present. The biosolids are stored on-site for one day, after which they are ready for land application.



THE CITY OF FORT WORTH IS THE FIRST AGENCY IN TEXAS TO HAVE AN NSP CERTIFIED BIOSOLIDS EMS (ENVIRONMENTAL MANAGEMENT SYSTEM) AND THE 7<sup>TH</sup> IN THE US.

### General Brochure

**CITY OF FORT WORTH QUICK FACTS**


- Fort Worth goal is to beneficially and apply 100% of all Biosolids
- Biosolids facility is operated by Renda Environmental Inc., in a public/private partnership.
- The City of Fort Worth's biosolids program received EMS (Environmental Management System) certification through the National Biosolids Partnership on July 20, 2005, making it the first program in Texas to be awarded this certification.
- All typical biosolids application rates (7 dry tons/acre), each acre of land receives 120lbs of plant available nitrogen, 70lbs of plant available phosphorus, and 20lbs of plant available potassium.


**FOR MORE INFORMATION**

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- Ben Davis  
Renda Environmental Inc.  
817.571.9391  
bdavis@rendaenvironmental.com

**SOURCES**

1. Texas Administrative Code, Title 30 Part 1 Chapter 312 Subchapter B Rule §312.43
2. Jaynes, W.F., Zarthan, R.E., Soosebe, R.E. and Wester, D.B., 2003. Biosolids Decomposition after Surface Applications in West Texas. Journal of Environmental Quality 32, 1772-1781.
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4. National Research Council. 1996. Use of Reclaimed Water and Sludge in Food Crop Production. National Academy Press, Washington, D.C., pp. 176.
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**Biosolids  
Technical Information**

### Technical Brochure

### Biosolids Program

**BENEFICIAL REUSE BY LAND APPLICATION**


Biosolids produced at the Village Creek Water Reclamation Facility are processed, anaerobically, and agriculturally land applied to thousands of acres of farmland and greenbelts in Tarrant and six surrounding counties in the North Texas area.

**MONITORING & MEASUREMENT**

- By City contract, the Contractor uses an independent certified laboratory to analyze the biosolids produced at Village Creek Water Reclamation Facility.
- Samples of biosolids are taken from the process areas and analyzed for local coliform, pathogens, metals, PCBs, pH, and percent solids.

**Since 1991, the City of Fort Worth has produced Class "A" Exceptional Quality Biosolids.**

**This is the highest quality recognized by The Environmental Protection Agency**



**SAFETY: What makes biosolids great for land application?**

- It has been estimated that biosolids within 95% of the ceiling levels (EPA requirement) would need to be applied to an area for 75 years before the soil concentration of these elements increased to a level of concern.
- In one study, cattle were fed a diet consisting of 12 percent biosolids material for 94 days and showed no adverse effects. Another study fed cattle a diet of 6 percent biosolids material for 141 days and again no adverse effects were observed.
- A multi-year study of people living near biosolids application sites was conducted. This study showed no significant differences in the health of the people near biosolids application versus people not near biosolids application. The same held true for their domestic animals.
- In biosolids amended fields the concentration of trace elements in crops does not increase.

**WATER CONSERVATION**

- Our product contains approximately 20% total nitrogen which means the other 80% is water. This aids to reduce the irrigation needs in the hot Texas summer months.
- When properly applied, biosolids pose almost no risk to groundwater or surface water.

**SOIL STABILITY**

- Biosolids add organic material to the soil, which helps bind soil particles into aggregates which in turn increase the pore space of the soil. One study showed an increase of aggregates of almost one-third.
- The increase in aggregate formation aids to reduce the erosion potential of the soil.
- Aggregate stability also increases with the addition of biosolids. Another study showed this increase to be approximately 24 percent.

**CROP PRODUCTION**

- Biosolids contain inorganic forms of nitrogen which are immediately available to crops. The organic component must undergo mineralization to become available.
- Crops in fields supplemented with biosolids tend to have an increased leaf biomass.
- Biosolids contain many trace elements, essential for plant growth.
- Due to the slow release component of biosolids, beneficial effects are seen up to three years after application.

**The City of Fort Worth produces Biosolids below the regulatory limits for metal concentrations.**

The data below is from sampling activities conducted between September 2012 to July 2013.

| Sept. 2012 - July 2013 | Average Monthly Concentration (mg/kg) | Maximum Concentration (mg/kg) | Percent of Monthly Concentration Exceeds (%) |
|------------------------|---------------------------------------|-------------------------------|--|
| Arsenic                | 0.11                                  | 0.41                          | 22.22  |
| Cadmium                | 1.15                                  | 3.01                          | 0.00   |
| Chromium               | 85.29                                 | 1,000                         | 22.22  |
| Copper                 | 608.49                                | 1,000                         | 30.56  |
| Lead                   | 18.00                                 | 100                           | 0.00   |
| Molybdenum             | 0.25                                  | 1.77                          | 2.78   |
| Nickel                 | 14.11                                 | 100                           | 0.00   |
| Nitrate                | 11.09                                 | 430                           | 7.74   |
| Selenium               | 0.11                                  | 0.41                          | 22.22  |
| Zinc                   | 63.0                                  | 1,000                         | 22.22  |



## SECTION 6: FUTURE PLANS/ADVANCES IN BIOSOLIDS TECHNOLOGY



**Landia Air Jet**

**Landia Air Jet System:** In an effort to mitigate odors from biosolids production, a Landia Air Jet system was installed on a 500,000 gallon sludge holding tank at the Dewatering Facility. The Landia Air Jet aerates the sludge stopping the anaerobic process and thus killing off anaerobes responsible for bad odors.

**Odor Control Study:** In July 2013, Village Creek began an odor control study. At its completion, factors attributable to bad odors within biosolids production will have been examined and evaluated in an effort to mitigate odors at the land application sites.

**Olfactometer:** In July 2013, Village Creek purchased an olfactometer in order to assess odors at the land application sites. This instrument allows for quantification of odors using different odor-filter cartridges. Using the olfactometer in conjunction with a weather tracker and range finder allows for a more detailed odor-monitoring history to be established for the different land application sites.

**NASAL RANGER®**  
field olfactometer



## SECTION 7: CONTACT INFORMATION

**If you have comments on this report or any other biosolids related items please call:**

**Village Creek Water Reclamation Facility**      **817.392.4960**

**Biosolids EMS Manager**      **817.392.4965**

To find out more information about the City of Fort Worth Biosolids Beneficial Reuse/Recycling program and the EMS visit our website:

[http://fortworthtexas.gov/water/info/default.aspx?id=6094&ekmense1=73b29971\\_1308\\_2386\\_6094\\_2](http://fortworthtexas.gov/water/info/default.aspx?id=6094&ekmense1=73b29971_1308_2386_6094_2)

To find out more information on biosolids in general, biosolids facts, regulation requirements, and about the national Biosolids Partnership EMS program, visit the website: <http://www.biosolids.org>



2012-2013

City of Fort Worth, Texas  
Water Department  
Village Creek Water Reclamation Facility  
Biosolids Management Program and EMS Performance Report

**APPENDIX A: CORRECTIVE ACTION NOTICES 2012-2013**

# 2012-2013

City of Fort Worth, Texas  
Water Department  
Village Creek Water Reclamation Facility  
Biosolids Management Program and EMS Performance Report

## CORRECTIVE ACTION NOTICES 2012-2013

| CAN #   | Date       | Non-Conformance Issue  | Scheduled Completion Date   | Actual Completion Date   | Close-Out Date |
|---------|------------|--|---|--|----------------|
| 2012-03 | 09/19/2012 | <b>Minor Non-Conformance:</b> Pre-Interim Audit was not conducted according to EMS Planning Schedule; it was to be conducted on July 31 <sup>st</sup> , but was not conducted until August 3 <sup>rd</sup> .   | 09/21/2012  | 09/21/2012   | 09/25/2012     |
| 2012-04 | 09/19/2012 | <b>Opportunity for Improvement:</b> Due to an increase in odor complaints, an evaluation of the number and type of complaints was conducted in order to understand common issues underlying the complaints and to find possible solutions.   | 10/11/2012  | 09/25/201  | 09/25/2012     |
| 2012-05 | 11/02/2012 | <b>Requirement 10.1:</b> The treatment plant has not completely developed and implemented standard operating procedures, work management practices, or other appropriate methods at all critical control points throughout the biosolids value chain, to effectively manage potential environmental impacts.   | 10/18/2013<br><i>sludge SOP's</i><br><br>12/31/2015<br><i>other SOP's</i>                     | 10/1/2013<br><i>sludge SOP's</i><br><br>pending<br><i>other SOP's</i>                              | pending        |
| 2012-06 | 11/02/2012 | <b>Requirement 3.3:</b> The list of critical control points identified in the EMS Master Table of Critical Control Points-EMS Element 3.0 does not accurately reflect all of the currently functioning critical control points.  | 01/31/2013  | 08/05/2013   | 08/23/2013     |
| 2012-07 | 11/02/2012 | <b>Requirement 3.4:</b> There is not a solid link between each critical control point with its corresponding operational controls.   | 01/31/2013  | 08/05/2013   | 08/23/2013     |
| 2012-08 | 11/02/2012 | <b>Requirement 10.1:</b> Within Operational Control of Critical Control Points – EMS Element 10.0, it states that the EMS management team shall review the operational control procedures regularly during EMS internal audits and work with managers to revise them. Additionally, the SOP for creation of SOPs requires an annual review of SOPs. The most recent review and update of SOPs is 2005. | 365 days for review of SOP creation/ review procedures;<br>01/31/2013 for updating Element 17 | 10/01/2013 for review of SOP creation/ review procedures;<br>08/05/2013 for update to Element 17.0 | 10/10/2013     |
| 2012-09 | 11/02/2012 | <b>Requirement 10.1:</b> The SOP Master Table of Contents and the various binders identified as SOP Manuals are not totally consistent one with another, there are several SOPs that are no longer in effect, and others are missing or not actually operating procedures.   | 10/18/2013  | 07/19/2013   | 10/10/2013     |

# 2012-2013

## CORRECTIVE ACTION NOTICES 2012-2013 (CONT.)

| CAN #   | Date       | Non-Conformance Issue  | Scheduled Completion Date | Actual Completion Date | Close-Out Date |
|---------|------------|--|---------------------------|------------------------|----------------|
| 2012-10 | 11/02/2012 | <b>Opportunity for Improvement:</b> The term “sludge” appears in certain elements with the EMS Manual-consider deleting if not used appropriately.   | 01/31/2013                | 08/05/2013             | 08/23/2013     |
| 2012-11 | 11/02/2012 | <b>Opportunity for Improvement:</b> The 17 elements in the EMS Manual do not currently have a list of cross-referenced elements in the reference sections-consider including.  | 01/31/2013                | 08/05/2013             | 08/23/2013     |
| 2012-12 | 11/02/2012 | <b>Opportunity for Improvement:</b> Element 4 does not currently have a designated time frame for updates and revisions to the legal table-consider including in the procedures.   | 01/31/2013                | 08/05/2013             | 08/23/2013     |
| 2012-13 | 11/02/2012 | <b>Opportunity for Improvement:</b> Consider converting all power savings into dollars saved for the current goals and objectives; estimate dollars saved through attainment of each of the other goals and objectives.  | 01/31/2013                | 08/05/2013             | 08/23/2013     |
| 2012-14 | 11/02/2012 | <b>Opportunity for Improvement:</b> Consider expanding the number and diversity of the individuals to be notified about the organization’s intent to receive an independent third party audit.   | 01/31/2013                | 08/05/2013             | 08/23/2013     |
| 2012-15 | 11/02/2012 | <b>Opportunity for Improvement:</b> Consider increasing the importance of training new employees on the Renda written standard operating procedures.   | 11/16/2013                | 11/16/2012             | 08/23/2013     |
| 2012-16 | 11/02/2012 | <b>Opportunity for Improvement:</b> Element 15 currently states to summarize cost savings of producing quality biosolids. It does not state to summarize dollars saved by accomplishing other goals and objectives (if applicable).  | 01/31/2013                | 08/05/2013             | 08/23/2013     |
| 2012-17 | 11/02/2012 | <b>Opportunity for Improvement:</b> Consider including a review of the level of implementation of the “Code of Good Practice” in the internal audits.  | 01/31/2013                | 08/05/2013             | 08/23/2013     |
| 2012-18 | 11/02/2012 | <b>Opportunity for Improvement:</b> Consider updating the proposed yearly interim and verification audit schedule to reflect that not more than one interim audit in succession is conducted through substituting an internal audit for the interim audit in years nine and ten. | 01/31/2013                | 08/05/2013             | 08/30/2013     |

# 2012-2013

## CORRECTIVE ACTION NOTICES 2012-2013 (CONT.)

| CAN #   | Date       | Non-Conformance Issue  | Scheduled Completion Date   | Actual Completion Date | Close-Out Date |
|---------|------------|--|---|------------------------|----------------|
| 2013-01 | 01/17/2013 | <b>Requirement 7.3:</b> Due to manpower constraints, several functions associated with Fort Worth's Biosolids EMS Program are not being properly implemented.  | 02/28/2013  | 05/03/2013             | 06/17/2013     |
| 2013-02 | 05/23/2013 | <b>Requirement 10.1:</b> Develop and implement standard operating procedures, work management practices or other appropriate methods at all critical control points throughout the biosolids value chain to effectively manage potential environmental impacts. On May 13, 2013 TCEQ issued a Notice of Enforcement to Renda Environmental for nuisance odors associated with land application activities. | 12/31/2013<br><br>*see odor related goals and objectives for progress | Pending                | Pending        |
| 2013-03 | 05/06/2013 | <b>Requirement 10.1:</b> On May 13, 2013, TQEQ issued a Notice of Violation to Renda Environmental for tracking material onto a public roadway in Wise County. Renda Environmental cleaned the roadway as required by the TCEQ inspector.  | 05/06/2013  | 05/06/2013             | 06/27/2013     |

2012-2013

City of Fort Worth, Texas  
Water Department  
Village Creek Water Reclamation Facility  
Biosolids Management Program and EMS Performance Report

## **APPENDIX B: GOALS AND OBJECTIVES**



| GOAL: Implementation of New Turbine Waste Heat Recovery System   |                       |   |                          |          |  |
|--|-----------------------|---|--------------------------|----------|--|
| Objective  | Milestone             | Responsible Party   | Targeted Completion Date | Status   | Key Outcomes                           |
| 1. Design/Planning   | Complete              | Ana Peña-Sr Professional Engineer, Gary LaGassey-Asst Water Sys Supt (Operations) | 31 Aug 2011              | Complete | Environmental Performance              |
| 2. Obtaining Building Permits  | Complete              | Jerry Pressley-Water Systems Superintendent                                       | 31 Aug 2011              | Complete |  |
| 3. Equipment Procurement   | Complete              | Ana Peña-Sr Professional Engineer   | 08 Jun 2012              | Complete | Improve Biosolids Management Practices |
| 4. Construction  | Complete              | Ana Peña-Sr Professional Engineer   | 08 Jun 2012              | Complete |  |
| 5. Testing   | Complete/not complete | Ana Peña-Sr Professional Engineer   | 31 Oct 2013              | Active   |  |
| ***Final cost savings associated with this goal will be a decrease of 13,159,439 kWh/yr of purchased power; which is a cost savings of \$940,110.30 (based on September 2013 data).*** |                       |   |                          |          |  |
| ***Average run time for steam blowers is 98.79 %; average output is 81.67% (based on September 2013 data).***  |                       |   |                          |          |  |

| GOAL: Conduct Grit Control Study   |                       |                                   |                          |          |  |
|------------------------------------|-----------------------|-----------------------------------|--------------------------|----------|--|
| Objective                          | Milestone             | Responsible Party                 | Targeted Completion Date | Status   | Key Outcomes   |
| 1. Award Contract for study        | Complete              | Ana Peña-Sr Professional Engineer | 15 May 2012              | Complete | Environmental Performance<br><br>Regulatory Compliance<br><br>Improve Biosolids Management Practices |
| 2. Data Acquisition                | Complete              | Ana Peña-Sr Professional Engineer | 30 May 2013              | Complete |  |
| 3. Analyze data and compile report | Complete/not complete | Ana Peña-Sr Professional Engineer | 31 Jun 2014              | Active   |  |

| GOAL: Create a Biosolids Master Plan          |                       |  |                          |                        |  |
|---|-----------------------|--|--------------------------|------------------------|--|
| Objective                                     | Milestone             | Responsible Party                      | Targeted Completion Date | Status                 | Key Outcomes   |
| 1. Award Contract for project                 | Complete              | Steven L. Nutter-Biosolids EMS Manager | 30 Apr 2012              | Complete               | Environmental Performance<br><br>Improve Biosolids Management Practices<br><br>Regulatory Compliance |
| 2. Workshop 1(Kickoff)                        | Complete              | Steven L. Nutter-Biosolids EMS Manager | 07 Jun 2013              | Complete               |  |
| 3. Submit formal data request                 | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 21 Jun 2013              | Complete               |  |
| 4. TMs 1 and2 Draft (Regulatory & Data)       | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 26 Jul 2013              | Complete (24 Sep 2013) |  |
| 5. Workshop 2(Criteria & Long List Selection) | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 26 Aug 2013              | Active (25 Sep 2013)   |  |
| 6. TM3 Draft (Model and short-term)           | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 23 Sep 2013              | Not complete           |  |
| 7. Workshop 3(Screen Alternatives)            | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 19 Nov 2013              | Not complete           |  |
| 8. TM 4 Draft (Market Analysis)               | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 20 Dec 2013              | Not complete           |  |
| 9. TM 5 Draft (Detailed Analysis)             | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 29 Jan 2014              | Not complete           |  |
| 10. Workshop 4 (Detailed Analysis)            | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 13 Feb 2014              | Not complete           |  |
| 11. TM 6 Draft (Long Term Plan)               | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 28 Mar 2014              | Not complete           |  |
| 12. Workshop 5(Long Term Plant)               | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 14 Apr 2014              | Not complete           |  |
| 13. Draft Master Plan Report                  | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 9 Jun 2014               | Not complete           |  |
| 14. Final Master Plan Report                  | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 14 Jul 2014              | Not complete           |  |
| 15. Contract Review Workshop                  | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 14 Mar 2014              | Not complete           |  |
| 16. TM & Draft (Contract Review)              | Complete/not complete | Steven L. Nutter-Biosolids EMS Manager | 28 Apr 2014              | Not complete           |  |

| GOAL: Pilot Project – Aeration of Holding Tank 1 to Reduce Odors Associated with Biosolids Land Application |                       |  |                          |                        |  |
|---|-----------------------|--|--------------------------|------------------------|--|
| Objective   | Milestone             | Responsible Party                        | Targeted Completion Date | Status                 | Key Outcomes   |
| 1. Hire consultant  | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 14 Jun 2013              | Complete               | Environmental Performance<br><br>Improve Biosolids Management Practices<br><br>Regulatory Compliance |
| 2. Consultant - Evaluate aerators & design system   | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 21 Jun, 2013             | Complete               |  |
| 3. Purchase aerator   | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 28 Jun 2013              | Complete (21 Jun 2013) |  |
| 4. Clean grit out of Storage Tank 1 if needed.  | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 26 Jul 2013              | Complete (3 Sep 2013)  |  |
| 5. Installation of aeration system  | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 9 Aug 2013               | Complete (12 Sep 2013) |  |
| 6. Evaluate Effectiveness in the field through odor monitoring  | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 28 Feb 2014              | Not complete           |  |

| GOAL: Study to Evaluate Biosolids Odors Associated With High Strength Wastes. |                       |  |                          |                        |  |
|---|-----------------------|--|--------------------------|------------------------|--|
| Objective   | Milestone             | Responsible Party                        | Targeted Completion Date | Status                 | Key Outcomes   |
| 1. Hire consultant  | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 5 Jul 2013               | Complete               | Environmental Performance<br><br>Improve Biosolids Management Practices<br><br>Regulatory Compliance |
| 2. Consultant – Develop scope of work and sampling plan                       | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 31 Jul 2013              | Complete (30 Jul 2013) |  |
| 3. Perform sampling and analysis  | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 31 Oct 2013              | Active                 |  |
| 4. Consultant- Produce technical report summarizing issues found during study | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 22 Nov 2013              | Not complete           |  |

| GOAL: Assess Effectiveness of BIOGLOX on Biosolids Odors              |                       |  |                          |                        |  |
|---|-----------------------|--|--------------------------|------------------------|--|
| Objective   | Milestone             | Responsible Party                        | Targeted Completion Date | Status                 | Key Outcomes   |
| 1. Meet with Bioglox representatives for product overview             | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 17 Aug 2013              | Complete (17 Aug 2013) | Environmental Performance<br><br>Improve Biosolids Management Practices<br><br>Regulatory Compliance |
| 2. Bioglox-conduct bench study using Village Creek sludge and Bioglox | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 17 Sep 2013              | Complete (17 Sep 2013) |  |
| 3. Discuss potential pilot study at dewatering facility               | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 17 Sep 2013              | Complete (17 Sep 2013) |  |
| 4. Design for pilot project   | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 4 Oct 2013               | Not Complete           |  |
| 5. Installation   | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 25 Oct 2013              | Not Complete           |  |
| 6. Evaluate effectiveness   | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 31 Jan 2014              | Not Complete           |  |

| GOAL: Increase Biosolids Outreach Activities in Response to Public Concerns  |                       |  |                          |   |                           |
|--|-----------------------|--|--------------------------|---|---------------------------|
| Objective  | Milestone             | Responsible Party                        | Targeted Completion Date | Status  | Key Outcomes              |
| 1. Identify four (4) public/third party concerns related to the biosolids value chain                                    | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 25 Sep 2014              | Active  | Improved Public Relations |
| 1.a - For each concern, either contact three (3) external agencies or conduct presentation with one (1) external agency. | Complete/not complete | Steven L. Nutter – Biosolids EMS Manager | 8 Nov 2013               | No Complete (Tour/presentation scheduled for various public officials.) |                           |